

PATENT
Attorney Docket No. 041501-5423

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
Woo Hyuk CHOI)	Confirmation No.: 1083
)	
Application No.: 09/843,781)	Group Art Unit: 2871
)	
Filed: April 30, 2001)	Examiner: Z. Qi
)	
For: REPAIR STRUCTURE FOR LIQUID)	Mail Stop Appeal Brief-Patents
CRYSTAL DISPLAY AND METHOD)	
OF REPAIRING THE SAME)	

Commissioner for Patents
U.S. Patent and Trademark Office
Mail Stop Appeal Brief-Patents
Alexandria, VA 22315

Sir:

This brief is in furtherance of the Notice of Appeal filed on December 20, 2004 in connection with the above-identified patent application, and appealing the final rejections of claims 1, 3-9, 12, 15-19, 21-24, and 26 by the United States Patent and Trademark Office in a Final Office Action dated July 26, 2004. The fee required under 37 C.F.R. § 1.17(c) is being filed concurrently herewith. The period for filing this brief extends through February 20, 2005.

1. THE REAL PARTIES IN INTEREST

The real party in interest in this appeal is LG.Philips LCD Co, Ltd. of Seoul, Korea.

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Related Appeals and Interferences

Appellant is not aware of any other appeals or interferences that will directly affect, will be directly affected by, or will otherwise have a bearing on, the decision in this appeal.

2. STATUS OF THE CLAIMS

The status of the claims is as follows:

Claims canceled: 2, 10, 11, 13, 14, 20, 25, and 27.

Claims withdrawn from consideration but not canceled: None.

Claims pending: 1, 3-9, 12, 15-19, 21-24, and 26.

Claims allowed: None.

Claims rejected: 1, 3-9, 12, 15-19, 21-24, and 26.

Claims appealed: 1, 3-9, 12, 15-19, 21-24, and 26.

3. STATUS OF AMENDMENTS

All amendments have been entered. A copy of the pending claims is attached as Appendix A to this brief.

4. SUMMARY OF CLAIMED SUBJECT MATTER

An aspect of the present invention involves a repair structure for a liquid crystal display having a substrate that includes scan lines and data lines disposed along mutually orthogonal directions at constant intervals defined in a matrix configuration. Accordingly, each of the scan lines crosses each of the data lines. During fabrication of the liquid crystal display device, electrical continuity of each of the scan and data lines may be compromised resulting in defects

of the scan and data lines. For example, during fabrication, the scan and data lines may come into electrical contact with each other resulting in a short-circuit connection. Accordingly, electrical signals transmitted along each of the scan and data lines may be interrupted, thereby decreasing fabrication yield of the liquid crystal display device.

Independent Claim 1

With respect to claim 1, as disclosed beginning at paragraph [0035] and as shown in FIGs. 2, 3A-3D, and 4A-4D, an exemplary repair structure for a liquid crystal display having a substrate 20 includes a scan line 21 on the substrate 20, a data line 23 crossing the scan line 21 and having first, second, and third segments such that the second segment is electrically isolated from the first and third segments and located at a portion where the scan line 21 and the data line 23 overlap, and a repair pattern 25 electrically isolated from the second segment and electrically connecting the first segment and the third segment of the data line 23, wherein the repair pattern 25 bypasses to pixel electrodes 27 and 27a adjacent to the data line 23 and has a portion overlapping the pixel electrodes 27 and 27a.

Independent Claim 9

With respect to claim 9, as disclosed beginning at paragraph [0067] and as shown in FIGs. 8 and 9, another exemplary repair structure for a liquid crystal display having a substrate 20 includes a data line 23 on the substrate 20, a scan line 21 crossing the data line 23 and having first, second, and third segments, wherein the second segment is electrically isolated from the first and third segments by an insulating material 51 and 51a and is located at a portion where the scan line 21 and the data line 23 overlap, and a repair pattern 25 electrically isolated from the second segment and electrically connecting the first segment with the third segment of the scan

line 21, wherein the repair pattern 25 bypasses to pixel electrodes adjacent to the scan line 21.

Independent Claim 17

With regard to independent claim 17, as disclosed beginning at paragraph [0055] and as shown in FIGs. 5, 6A-6d, and 7A-7E, an exemplary method of repairing a liquid crystal display having a plurality of scan lines 21 and data lines 23 which are arranged to cross each other includes steps of electrically isolating, via holes 31 and 31a, a portion of the data lines 23 that are short circuited with the scan lines 21 where the data lines 23 and scan lines 21 are overlapped, thereby forming first, second, and third segments of the data lines 23, wherein the isolated portion is the second segment, forming contact holes 32 and 32a over each of the first and third segments of the data lines 23, forming a repair pattern 25 electrically connecting the first and third segments of the data lines 23 through the contact holes 32 and 32a, wherein the repair pattern 25 is electrically isolated from the scan lines 21, and forming an insulating material 51 to fill portions between the first and second segments of the data lines 23 and between the second and third segments of the data lines 23.

Independent Claim 22

With regard to independent claim 22, as disclosed beginning at paragraph [0067] and as shown in FIGs. 8 and 9, another exemplary method of repairing a liquid crystal display having a plurality of scan lines 21 and data lines 23 which are arranged to cross each other includes the steps of electrically isolating a portion of the scan lines 21 that are short circuited with the data lines 23 where the data lines 23 and scan lines 21 are overlapped, thereby forming first, second, and third segments of the scan lines 21, wherein the isolated portion is the second segment, forming contact holes (analogous to holes 25 in FIG. 7E) over each of the first and third

segments of the scan lines 21, forming a repair pattern 25 electrically connecting the first and third segments of the scan lines 21 through the contact holes, wherein the repair pattern 25 is electrically isolated from the data lines 23, and forming an insulating material 51 to fill portions between the first and second segments of the scan lines 21 and between the second and third segments of the scan lines 21.

5. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The rejections at issue are as follows:

Claims 1, 3-9, 11-19, and 22-24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Salisbury (US 5,303,074) in view of Henley (US 5,459,410).

Claims 21 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Salisbury in view of Henley and Baum et al. (US 5,407,710).

6. ARGUMENTS

(i) Rejections under 35 U.S. C. § 112, first paragraph

No claims are presently rejected under 35 U.S. C. § 112, first paragraph.

(ii) Rejections under 35 U.S. C. § 112, second paragraph

No claims are presently rejected under 35 U.S. C. § 112, second paragraph.

(iii) Rejections under 35 U.S.C. § 102

No claims are presently rejected under 35 U.S. C. § 102.

(iv) Rejections under 35 U.S.C. § 103(a)

Appellant respectfully submits that the numerous applied references, whether taken separately or in combination, fail to teach or suggest Appellant's claimed combinations. Further, it is respectfully submitted that the Final Office Action fails to establish a *prima facie* case of obviousness of the claimed invention, and the none of the applied references, whether taken singly or in combination, renders the claimed invention obvious.

The rejection of claims 1, 3-9, 12, 15-19, 21-24, and 26, therefore, should be reversed because none of the applied references, whether taken alone or in combination, would have rendered the claimed invention as a whole obvious at the time of the invention to a person having ordinary skill in the art.

Claims 1, 3-9, 12, 15-19, and 22-24

Appellant respectfully submits that the applied references, whether taken separately or in combination, fail to teach or suggest every feature of independent claims 1, 9, 17, and 22.

The Final Office Action admits that "Salisbury does not expressly disclose that the repair pattern bypasses to pixel electrodes adjacent to the data line and has a portion overlapping the pixel electrodes," and "forming an insulating material to fill the portions between the second segment and the first segment of the data lines (or the scan lines) and between the second segment and the third segment of the data lines (or the scan lines)." Thus, the Final Office Action relies upon Henley for allegedly teaching a conductive bridge 88 such that "when forming the conductive bridge, the repair pattern **must** have a portion of the conductive bridge which bypasses to pixel electrodes adjacent to the data line" and "the conductive bridge **must** have a portion overlapping the pixel electrodes" (emphasis added). In addition, the Final Office Action relies upon Henley for apparently asserting that "the gate line (scan line) and the data line

form the pixel region, as shown in Figs. 6 and 14, and the repair pattern is a conductive bridge across the pixel region as shown in Fig. 12.” Furthermore, the Final Office Action further asserts that “Henley indicates (col.2, lines 15-18) such repair structure improving the production yields, especially, for assembling high density active matrix LCD panels.”

As a result, the Final Office Action alleges that it would have been “obvious to those skilled in the art at the time the invention was made to arrange a repair pattern as claimed in claims 1 and 9 for improving the production yields of the high density active matrix LCD display.”

However, Appellant respectfully asserts that the Final Office Action’s alleged motivation to modify Salisbury (i.e., arranging a repair pattern as claimed in claims 1 and 9 for improving the production yields of the high density active matrix LCD display) is neither taught nor suggested anywhere in Henley. As clearly shown in FIGs. 12a-12c and discussed at col. 11, line 65 to col. 12, line 6 of Henley, the conductive bridge 88 is formed to contact areas 84 and 86 without shorting to data line 13. However, Appellant respectfully asserts that Henley is silent with respect to overlapping adjacent pixel electrodes. Furthermore, Appellant respectfully asserts that FIGs. 6 and 14 of Henley are merely schematic circuit diagrams that neither teach nor suggest “the repair pattern is a conductive bridge across the pixel region,” as alleged by the Final Office Action. Accordingly, Appellant respectfully asserts that Henley is completely silent with respect to “the repair pattern bypasses to pixel electrodes adjacent to the data line and has a portion overlapping the pixel electrodes,” as recited by independent claim 1, and hence dependent claims 3-8.

The Final Office Action further admits that Salisbury does not expressly disclose “forming an insulating material to fill the portions between the second segment and the first segment of the data lines (or the scan lines) and between the second segment and the third segment of the data lines (or the scan lines).” In addition, the Final Office Action apparently relies upon reasoning (page 6, lines 8-20) that since Salisbury discloses (col. 7, line 65 to col. 8, line 3) electrically insulating conductive lines by forming an intermediate layer of dielectric material between the conductive lines, then it “is a conventional technique [for] filling an insulating material between the two conductive segments in order to insulate the two conductive segments, because the insulating material has a reliable insulating property.”

As a result, the Final Office Action alleges that it would have been “obvious to those skilled in the art at the time the invention was made to fill an insulating material into the portions between the segments of the data lines or scan lines as claimed in claims 17 and 20 in order to obtain a reliable insulation between the conductive segments.”

However, Appellant respectfully asserts that the Final Office Action’s alleged reasoning (i.e., motivation) to modify Salisbury (i.e., electrically insulating adjacent data or scan line segments) is neither taught nor suggested anywhere in Salisbury. As discussed at col. 6, lines 36-45 of Salisbury, “the associated repair line allows the two lines to be electrically coupled without the device needing to be disassembled to make the coupling.” Moreover, Salisbury discloses (col. 3, lines 27-30) that “[i]t is another object of the present invention to provide a thin film electronic device structure that readily provides for repair of the device **after** it has been fabricated” (emphasis added). Accordingly, the device disclosed by Salisbury is designed to be repaired without any additional fabrication processing, i.e., post-fabrication deposition of

conductive/insulative materials. Thus, Appellant respectfully asserts that the Final Office Actions' alleged reasoning is directly contrary to the disclosure of Salisbury, and as such, one of ordinary skill in the art would not re-process the finished device of Salisbury to deposit insulating material within the severence points 160A and 160B in FIG. 2B of Salisbury.

Further, since claims 3-8, 12, 15, 16, 18, 19, 21, 23, 24, and 26 depend from claims 1, 9, 17, and 22, it is respectfully submitted that Salisbury in view of Henley does not render claims 1, 3-9, 11-19, and 22-24 unpatentable. Accordingly, withdrawal of the rejection of claims 1, 3-9, 11-19, and 22-24 under 35 U.S.C. §103(a) is respectfully requested.

Claims 21 and 26

Appellant respectfully submits that at least because claims 21 and 26 depend on independent claims 17 and 22, respectively, and because Baum et al. fails to remedy the above-mentioned deficiencies of Salisbury in view of Henley, claims 21 and 26 are allowable.

Conclusion

In view of the foregoing, Appellant respectfully requests the reversal of the Final Office Action's rejection and allowance of all of the pending claims. If there are any other fees due in connection with the filing of this Brief, please charge the fees to our Deposit Account No. 50-0310.

If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such an extension is requested and the fee should also be charged to our deposit account.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

By: _____



David B. Hardy
Reg. No. 47,362

Dated: February 16, 2005

Customer No.: 009629

MORGAN, LEWIS & BOCKIUS LLP

1111 Pennsylvania Avenue, N.W.

Washington, D.C. 20004

Telephone: 202.739.3000

Facsimile: 202.739.3001

7. APPENDIX A - CLAIMS ORDERED BY NUMBER

Claim 1 (Previously Presented): A repair structure for a liquid crystal display having a substrate, comprising:

a scan line on the substrate;

a data line crossing the scan line and having first, second, and third segments, wherein the second segment is electrically isolated from the first and third segments and located at a portion where the scan line and the data line overlap; and

a repair pattern electrically isolated from the second segment and electrically connecting the first segment with the third segment of the data line, wherein the repair pattern bypasses to pixel electrodes adjacent to the data line and has a portion overlapping the pixel electrodes.

Claim 2 (Canceled).

Claim 3 (Previously Presented): The repair structure according to claim 1, wherein a portion of the pixel electrodes overlapped the repair pattern is electrically isolated from other portions of the pixel electrodes.

Claim 4 (Original): The repair structure according to claim 1, wherein the repair pattern is formed along an upper portion of the data line.

Claim 5 (Original): The repair structure according to claim 1, further comprising an insulating material formed between the first and second segments of the data line and the second and third segments of the data line.

Claim 6 (Original): The repair structure according to claim 1, wherein the repair pattern has a "[" shape.

Claim 7 (Original): The repair structure according to claim 1, wherein the repair pattern has an "I" shape.

Claim 8 (Previously Presented): The repair structure according to claim 1, wherein the repair pattern is formed of metal.

Claim 9 (Previously Presented): A repair structure for a liquid crystal display having a substrate, comprising:

a data line on the substrate;

a scan line crossing the data line and having first, second, and third segments, wherein the second segment is electrically isolated from the first and third segments by an insulating material and is located at a portion where the scan line and the data line overlap; and

a repair pattern electrically isolated from the second segment and electrically connecting the first segment with the third segment of the scan line, wherein the repair pattern bypasses to pixel electrodes adjacent to the scan line.

Claim 10 (Canceled).

Claim 11 (Canceled).

Claim 12 (Previously Presented): The repair structure according to claim 9, wherein the repair pattern is formed along an upper portion of the scan line.

Claim 13 (Canceled).

Claim 14 (Canceled).

Claim 15 (Original): The repair structure according to claim 9, wherein the repair pattern has an "I" shape.

Claim 16 (Previously Presented): The repair structure according to claim 9, wherein the repair pattern is formed of metal.

Claim 17 (Previously Presented): A method of repairing a liquid crystal display having a plurality of scan lines and data lines which are arranged to cross each other, the method comprising the steps of:

electrically isolating a portion of the data lines that are short circuited with the scan lines where the data lines and scan lines are overlapped, thereby forming first, second, and third segments of the data lines, wherein the isolated portion is the second segment;

forming contact holes over each of the first and third segments of the data lines;

forming a repair pattern electrically connecting the first and third segments of the data lines through the contact holes, wherein the repair pattern is electrically isolated from the scan lines; and

forming an insulating material to fill portions between the first and second segments of the data lines and between the second and third segments of the data lines.

Claim 18 (Original): The method according to claim 17, wherein the step of electrically isolating a portion of the data lines is carried out by a laser.

Claim 19 (Original): The method according to claim 17, wherein the contact holes are formed by using a laser.

Claim 20 (Canceled).

Claim 21 (Original): The method of claim 17, wherein the repair pattern is formed by laser induced chemical vapor deposition.

Claim 22 (Previously Presented): A method of repairing a liquid crystal display having a plurality of scan lines and data lines which are arranged to cross each other, the method comprising the steps of:

electrically isolating a portion of the scan lines that are short circuited with the data lines where the data lines and scan lines are overlapped, thereby forming first, second, and third segments of the scan lines, wherein the isolated portion is the second segment;

forming contact holes over each of the first and third segments of the scan lines;

forming a repair pattern electrically connecting the first and third segments of the scan lines through the contact holes, wherein the repair pattern is electrically isolated from the data lines; and

forming an insulating material to fill portions between the first and second segments of the scan lines and between the second and third segments of the scan lines.

Claim 23 (Original): The method according to claim 22, wherein the step of electrically isolating a portion of the scan lines is carried out by a laser.

Claim 24 (Original): The method according to claim 22, wherein the contact holes are formed by using a laser.

Claim 25 (Canceled).

Claim 26 (Original): The method of claim 22, wherein the repair pattern is formed by laser induced chemical vapor deposition.

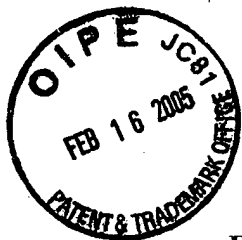
Claim 27 (Canceled).

8. APPENDIX B – EVIDENCE

No information is appended under this section.

9. APPENDIX C – RELATED PROCEEDINGS

No information is appended under this section.



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Woo Hyuk CHOI)	Confirmation No.: 1083
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APPELLANT'S BRIEF TRANSMITTAL FORM

1. Transmitted herewith is the Appellant's Brief Under 37 C.F.R. 1.192, which is being submitted further to the Notice of Appeal filed December 20, 2004.
2. Additional papers enclosed.

- ☐ Drawings: [] Formal [] Informal (Corrections)
- ☐ Information Disclosure Statement
- ☐ Form PTO-1449, ___ references included
- ☐ Citations
- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

3. Oral Hearing Under 37 C.F.R. 1.194

- ☐ Oral hearing is hereby requested.
☐ Fee under 37 C.F.R. 1.17(d) is enclosed.

4. Extension of time

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

- ☐ Appellant petitions for an extension of time, the fees for which are set out in 37 CFR 1.17(a)-(d), for the total number of months checked below:

<u>Total months requested</u>	<u>Fee for extension</u>	<u>[fee for Small Entity]</u>
<input type="checkbox"/> one month	\$ 120.00	\$ 60.00
<input type="checkbox"/> two months	\$ 450.00	\$ 225.00
<input type="checkbox"/> three months	\$ 1,020.00	\$ 510.00
<input type="checkbox"/> four months	\$1,590.00	\$ 795.00
<input type="checkbox"/> five months	\$2,160.00	\$1,080.00

Extension of time fee due with this request: \$ 0.00.

If an additional extension of time is required, please consider this a Petition therefor.

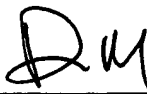
5. Fee Payment

- ☐ No fee is to be paid at this time.
- ☒ The Commissioner is hereby authorized to charge \$500.00 for the Appeal Brief filing fee due to Deposit Account No. 50-0310.

☒ The Commissioner is hereby authorized to charge any fees including fees due under 37 CFR 1.16 and 1.17 which may be required, or credit any overpayment to Deposit Account No. 50-0310.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS

By: 
David B. Hardy
Reg. No. 47,362

Date: February 16, 2005

CUSTOMER NO. 009629
MORGAN, LEWIS & BOCKIUS LLP
1111 Pennsylvania Avenue, NW
Washington, D.C. 20004
Tel.: (202) 739-3000